

What Is Claimed Is:

1. Conductive particles comprising at least any two materials selected from the group consisting of Sn, Bi, In, Pb, and alloys resulting from combining any two or more thereof, said at least any two materials being in mutual contact.

2. Conductive particles according to claim 1, wherein at least two materials of said at least any two materials are capable of producing an alloy having a melting point lower than 230°C by being heated at a temperature lower than 230°C.

3. Conductive particles according to claim 1 having one of said at least any two materials as a base material thereof, and another material as a coating material to cover the base material.

4. Conductive particles according to claim 1, wherein said at least any two materials are Sn and at least one type of material selected from the group consisting of Bi and In.

5. Conductive particles according to claim 1, wherein said at least any two materials are Pb and at least one type of material selected from the group consisting of Sn, Bi and In.

6. Conductive particles according to claim 3, wherein the coating material has a film thickness corresponding to 5% or greater of the average particle size of the base material.

7. A conductive composition comprising:

conductive particles described in claim 1; and

a thermosetting resin having a curing temperature lower than 230°C and/or a thermoplastic resin having a melting point lower than 230°C.

8. A conductive composition according to claim 7,  
5 wherein said thermosetting resin having a curing temperature lower than 230°C and/or said thermoplastic resin having a melting point lower than 230°C is at least one resin selected from the group consisting of epoxy-based, phenolic-based and acrylic-based thermosetting resins, and polyethylene type,  
10 polyester type, polypropylene type and acrylic type thermoplastic resins.

9. A conductive composition according to claim 7,  
comprising 10 to 100 parts by weight of said thermosetting resin and/or said thermoplastic resin based on 100 parts by  
15 weight of said conductive particles.

10. An electronic device comprising a conductive composition layer having:

a region of a metal or alloy having a melting point of 230°C or higher;

20 a region of an alloy having a melting point lower than 230°C; and

a region comprising a thermoset resin and/or thermoplastic resin,

wherein at least one portion of the upper surface and one  
25 portion of the lower surface of said conductive composition layer are linked to each other by a region of said alloy having a melting point lower than 230°C.

11. An electronic device according to claim 10,  
wherein:

said region of said metal or alloy having a melting  
point of 230°C or higher is composed of at least any one  
5 material selected from the group consisting of Sn, Bi, and  
Pb; and

said region of said alloy having a melting point lower  
than 230°C is composed of an alloy resulting from combination  
of at least any two materials selected from the group  
10 consisting of Sn, Bi, In, and Pb.

12. An electronic device having a conductive  
composition layer obtained by heat-treating, at a temperature  
below 230°C, a conductive composition comprising:

said conductive particles described in claim 1;  
15 and

a thermosetting resin having a curing temperature  
lower than 230°C and/or a thermoplastic resin having a  
melting point lower than 230°C.

13. An electronic device according to any one of  
20 claims 10 to 12, wherein said thermosetting resin having a  
curing temperature lower than 230°C and/or said thermoplastic  
resin having a melting point lower than 230°C, or,  
alternatively, said thermoset resin and/or thermoplastic  
resin, is at least one resin selected from the group  
25 consisting of epoxy-based, phenolic-based and acrylic-based  
thermosetting resins or thermoset resins thereof, and

polyethylene type, polyester type, polypropylene type and acrylic type thermoplastic resins.

14. An electronic device having a conductive composition layer described in claim 10 between at least one  
5 combination of a semiconductor device and a cooling member, a semiconductor device and a substrate, and a lead terminal and a substrate.

15. An electronic device manufacturing method comprising steps of:

10       subjecting to bonding a conductive composition comprising conductive particles as described in any one of claims 1 to 6, and a thermosetting resin having a curing temperature lower than 230°C and/or a thermoplastic resin having a melting point lower than 230°C; and

15       performing a heat treatment on said composition, wherein provision is made so that a layer made of said composition exhibits conductivity when said heat treatment is finished.

16. An electronic device manufacturing method  
20 according to claim 15, wherein said heat treatment is performed at a temperature below 230°C.

17. An electronic device manufacturing method according to claim 15, wherein said thermosetting resin having a curing temperature lower than 230°C and/or said  
25 thermoplastic resin having a melting point lower than 230°C is at least one resin selected from the group consisting of epoxy-based, phenolic-based, and acrylic-based thermosetting

